REMARKS

Examiner's Rejections and Objections

The foregoing Amendment and remarks which follow are responsive to the initial Office Action mailed November 27, 2001. In that Office Action, the Examiner rejected Claim 13 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner further rejected Claims 1-3, 5-6, 8-10 and 12-13 under 35 U.S.C. § 103(a) as being unpatentable over Ishida (U.S. Pat. No. 5,949,565 "Ishida Reference") in view of Cern (U.S. Pat. No. 5,815,298 "Cern Reference"). Claims 4 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ishida Reference in view of the Cern Reference and in further view of Croft et al. (U.S. Pat. No. 5,864,708 "Croft Reference"). Claims 7 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ishida Reference in view of the Cern Reference and in further view of Kobayashi (U.S. Pat. No. 5,986,785 "Kobayashi Reference"), or Karstensen et al. (U.S. Pat. No. 5,923,451 "Karstensen Reference").

Applicants' Response

I. 35 U.S.C. § 112, Second Paragraph

The Examiner stated that there was insufficient antecedent

basis for the limitation "said first and second circuit cards" for Claim 13. Applicant has amended Claim 8 to provide such antecedent basis for first and second circuit cards. Applicant respectfully submits that such amendments to Claim 8 now contain proper antecedent basis and overcome the Examiner's stated grounds of rejection.

II. 35 U.S.C. § 103(a)

As to independent Claims 1 and 8, the Examiner stated that such claims were obvious under 34 U.S.C. § 103(a) over the Ishida reference in view of the Cern reference. Applicant respectfully submits that both the Ishida and Cern references are distinguishable from the present invention. Furthermore, combining the Ishida and Cern references would not produce the present invention. In this respect, Applicant respectfully submits that independent Claims 1 and 8, as amended, are novel in view of the cited references. A more detailed discussion explaining the distinguishable aspects of the alleged prior art is provided below.

A. *The Present Invention*

The present invention overcomes several deficiencies in the prior art by providing a shock-resistant system which initiates intercard optical communications between the circuit cards in a

computer system. Specifically, the computer system includes a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship. Advantageously, the common backplane used in conjunction with the LEDs and photodiodes of the first and second circuit cards allows circuit cards mounted in the circuit card connectors to effectuate optical intercard communications therebetween which are conducted independent of shock-susceptible wired connectors. Such communications may occur even though the first and second circuit cards operate at differing voltages. In addition, the use of such LEDs and photodiodes form a more reliable connection between the first and second circuit cards as opposed to hard-wiring. For example, in applications where computer systems must be transported frequently and otherwise withstand harsh environmental conditions, the wires may become dislodged from frequent impacts and shock exerted thereupon. Such disconnections require maintenance and diagnosis to determine the source of the problem. Further, the use of the common backplane creates a rigid environment for the circuit cards to be retained thereto and prevents the circuit cards from being dislodged therefrom. Thus, by providing an optical communications link between the first and second circuit cards and mounting the cards to a common backplane, the cards may then

withstand shock and continue to communicate in spite thereof. Additionally, mounting the first and second circuit cards in a generally upright parallel relationship facilitates the optical communications such that their respective LEDs and photodiodes may be placed into communication with each other.

A. *The Ishida Reference*

As understood, the Ishida reference discloses a portable electronic apparatus having a separate computer body and a separate display without any use of a common backplane. More specifically, the computer body has it's own computer housing and motherboard while the display has it's own housing and motherboard as well. Ishida further discloses the use of a light emission element disposed on the computer body which transmits optical signals to a light receive element disposed on the display via an inner hole of a boss. It is within this boss that the display and the computer body rotatably engage each other. Thus, the Ishida reference discloses a computer system having two separate and distinct components, the computer body and the display, each of the components having its own housing and motherboard such that optical signals may be communicated from one component to the other via a point of engagement.

As understood, the Ishida reference is designed to overcome a

problem inherent to laptop systems where traditional ribbon cables connecting the computer body with the display are worn out due to repetitive use sustained by frequent opening and closing of the display. Ishida replaces the ribbon cable with the optical transmitter and receiver, but such optical communications are intended to prevent disconnections between the separate computer body and the separate display.

Nothing suggests that the computer body (or its components) and the display housing (or its components) could share a common backplane. Moreover, even examining the computer body and the display housing individually, nothing suggests that such optical communications could be conducted within either the display or the housing or that there would be any advantage to doing so. The computer body utilizes a central motherboard structure. Within such a motherboard, circuitry for interconnecting various electronic components is embedded therewithin. Such a configuration is typically found in proprietary motherboards specifically designed to interconnect that particular configuration of components, and there is usually little room to interchange such components. As Ishida states, a "circuit board 7 is placed in substantially parallel with the bottom wall 5a of the housing 4." (Col. 4, lns. 5-6). Further, it is within this motherboard that "a hard disc drive 8 and a circuit elements 9 such a DRAM and a number

of other electronic components" are mounted thereon (Col. 4, lns. 6-8). Similarly, displays are also usually formed in the same manner. Thus, in the context of the Ishida reference, it is difficult to understand how or why one might utilize optical communications within Ishida's computer housing or display housing when such connections could be made more simply and effectively via circuitry embedded on the motherboard. By contrast, the present invention is specifically designed to allow for intercard communications via optical communications. It should also be noted that to integrate such optical communications in the Ishida system would require extensive programming and design, none of which is taught by Ishida.

In this respect, the Ishida reference fails to disclose a common backplane having a plurality of circuit card connectors. Nor does Ishida disclose first and second circuit boards mounted to the circuit card connectors such that intracard communications may be conducted between the circuit cards via the backplane. Instead, the Ishida reference merely teaches transmitting optical data between separate and distinct components which each have their own respective housings and fail to provide for any common backplane at all or any suggestions to integrate such a structure. To further demonstrate this point, Applicant directs the Examiner's attention to Figure 3. In Figure 3, the Ishida reference clearly illustrates

how the display (3) and the housing (2) are separate and distinct and that each contain their own circuitry therein.

A further advantage of the present invention in comparison to the prior art is the use of LEDs and photodiodes to create bidirectional communications links between the first and second circuit cards, thereby improving heat dissipation and air circulation within a computer system enclosure. In this respect, typical large scale computer systems and those utilizing embedded applications have several cables hardwired to each other such that much of the airspace inside the enclosure is littered with cables. One of the primary causes for computer system failure is overheating caused from lack of proper air circulation. Such a problem is even more apparent where the circuit cards are disposed in a generally upright parallel relation since much of the heat may be trapped therebetween and the use of cabling might further prevent such heat from dissipating therefrom. While computer systems may be equipped with intake and exhaust fans to induce air circulation, computer system enclosures having such cables suffer from inefficient air circulation because the air must navigate through the cables, thereby reducing the speed of air flowing throughout the enclosure. By wholly eliminating the use of cables in a computer system enclosure and adopting the use of LEDs and photodiodes on each circuit card for communications between circuit

cards, computer system enclosures may be cooled in a far more efficient manner due to the elimination of obstacles which formerly impeded proper air circulation. In this respect, reducing the amount of obstructions within the enclosure allows the circulating air to cool crucial microprocessors and circuits which heat up with extended use.

C. *The Cern Reference*

As understood, the Cern reference discloses the use of transceivers wherein bidirectional optical communications may be performed between two separate communications stations. However, Applicant respectfully submits that the Cern reference is distinguishable in that the communications stations are disclosed as being separate and distinct stations which do not share any common backplane. As described in the Cern reference, voice communications may be conducted between the stations such that a technician may speak into one station and transmit that signal to a second station where another technician is listening. (Cern, Col. 5, lns. 66-67 and Col. 6, lns. 1-19). In addition, Cern describes such second station as being a "remote station," which infers that while there may be a wireless connection between the two stations, there is no common backplane connecting the two. (Cern, Col. 7, lns. 1-7). In this respect, as Applicant understands, the Cern

reference merely discloses the use of two independent stations communicating with each other via a bidirectional optical communications link. Therefore, Applicant respectfully submits that while the Cern reference discloses transceivers capable of forming a bidirectional optical link therebetween, such link is taught only in the context of separate stations, each of which fail to share a common backplane.

Additionally, Ishida describes the use of optical communications to provide a link between the computer body and the display. Since displays are generally output-only devices, it is difficult to understand any benefit or desire for the Ishida reference to implement bidirectional communications since data is only fed to the display from the system. Nothing suggests that the Ishida system would benefit in being able to send signals to the computer body from the display. In that respect, Applicant submits that there is no motivation or suggestion to combine Cern's bidirectional communications systems with the Ishida system. By contrast, the present invention effectuates optical intercard communications while both the first and second circuit cards share a common backplane.

D. *Combining the Ishida and Cern References Will Not Create the Present Invention.*

Applicant respectfully submits that combining the Ishida and Cern references together will not create the present invention. Applicant believes the Ishida and Cern references are distinguishable from the present invention. However, even assuming arguendo, combining the Ishida and Cern references would create a wholly different invention in comparison to the present invention. At best, such a combination might create an electronic apparatus having two separate and distinct components (the computer body and the display), each of the components having their own respective housings and motherboards. Furthermore, even if the transceivers disclosed by Cern were to be combined with the electronic apparatus in Ishida, nothing in the Cern reference teaches or suggests that such transceivers could operate within Ishida's electronic apparatus since Cern describes the transceivers as being placed within stations which operate independently from each other. Additionally, there is no common backplane described anywhere in the Cern reference and there is no teaching or suggestion that such transceivers are or can be mounted to a common backplane. In this respect, the common backplane of the present invention provides for shock-resistant properties and neither Cern nor Ishida disclose any desirability for such a backplane, especially in lieu of the separate and independent nature of the components disclosed therein.

III. New Independent Claim 15

Applicant has amended new independent Claim 15 which contains the substance of amended independent Claim 1 yet emphasizes the novelty of the optical communications device on the first and second circuit cards. More specifically, Independent Claim 15 emphasizes that the optical communications provided in the present invention are not limited to the use of LEDs and photodiodes. As one of ordinary skill will recognize, other types of optical devices, such as LEDs and photodiodes, may be used within the scope of the invention in combination with one directional or bidirectional circuits, all of which is intended to be encompassed within the scope of the claimed invention.

IV. Request for Allowance

Applicant submits that dependant Claims 2-4 and 6-7 further define novel details of the invention as cited in independent Claim 1 while dependent Claims 9-11 and 13-14 further define novel details of the invention as cited in independent Claim 8. Lastly, Applicant submits that new independent Claim 15 is novel in view of the prior art. On the basis of the foregoing, Applicant submits that the stated grounds of rejection have been overcome, and that such claims are in now condition for allowance. An early Notice of Allowance is therefore respectfully submitted.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

Should the Examiner have any suggestions for expediting allowance of the application, the Examiner is invited to contact Applicant's representative at the telephone number listed below. If a fee is required, please charge Account Number 14-1325.

Respectfully submitted,

Date: Mar 5, 2002 By: _____

Bruce B. Brunda
Registration No. 28,947
STETINA BRUNDA GARRED & BRUCKER
75 Enterprise, Suite 250
Aliso Viejo, CA 92656
(949) 855-1246

BBB:STB/cb
T:\Client Documents\NORTH\390a\NORTH-390A Amendment (v2).wpd

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend the following Claims:

1. (Amended) A shock-resistant system for operatively interconnecting circuit cards [modules] within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) [a.] a first [module] circuit card mounted to one of said circuit card connectors, said first circuit card having a first transmitter LED and a first receiver photodiode respectively formed thereon;

c) [b.] a second [module] circuit card mounted to another of said circuit card connectors, said second circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon; and

d) [c.] wherein said first and second [modules] circuit cards are maintained in fixed relationship to one another via said common backplane to effectuate optical intercard communications therebetween, said intercard communications being conducted independent of shock-susceptible wired

connectors such that said first receiver photodiode on said first [module] circuit card is operative to receive [a signal] signals produced from said second transmitter LED of said second [module] circuit card, [and] said second receiver photodiode [is] being operative to receive signals from said first transmitter LED of said first [module.] circuit card.

2. (Amended) The system of Claim 1 wherein said signals generated by said first and second transmitter LEDs and received by said first and second receiver photodiodes [comprised] comprise optically transmitted infrared radiation.

3. (Amended) The system of Claim 2 wherein said transmission and reception of signals between said first and second transmitter [LED's] LEDs and said first and second receiver photodiodes comprise a standardized infrared communications scheme protocol.

5. (Amended) The system of Claim 1 wherein said first and second circuit cards [modules] are housed within an enclosure.

7. (Amended) The system of Claim 1 wherein said system comprises a multiplicity of [modules] circuit cards wherein each respective one of said multiplicity of [modules] circuit cards has a dedicated transmitter LED and receiver photodiode formed thereon, each respective one of said multiplicity of [modules] circuit cards being operative to transmit and receive data via said transmitter LED and said receiver photodiode formed thereon with the respective

other [modules] circuit cards of said multiplicity of circuit cards. [modules.]

8. (Amended) A method for operatively interconnecting [modules] circuit cards within a computer to enable data to be transmitted and received therebetween comprising:

a) forming a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally parallal upright relationship;

b) [a.] providing a first [module] circuit card having [at least one] a first transmitter LED diode and a receiver photodiode respectively formed thereon;

c) [b.] providing a second [module] circuit card having a second transmitter LED and a second receiver photodiode respectively formed thereon;

d) mounting said first circuit card to one of said circuit card connectors;

e) mounting said second circuit card to another of said circuit card connectors; and

f) [c.] spatially arranging said first circuit card [module] relative to said second circuit card [module] via said common backplane to effectuate optical intercard communications therebetween, said intercard communications

being conducted independent of shock-susceptible wired connectors such that said first receiver photodiode on said first [module] circuit card is operative to receive [a signal] signals produced from said second transmitter LED of said second [module] circuit card, [and] said second receiver photodiode [is] being operative to receive signals from said first transmitter LED of said first [module] circuit card.

9. (Amended) The method of Claim 8 wherein step [c)] f), said signals generated by said first and second transmitter LEDs and received by said first and second receiver photodiodes comprise optically transmitted infrared radiation.

10. (Amended) The method of Claim 8 wherein in step [c)] f), said transmission and reception of signals between said first and second transmitter LEDs and said first and second receiver photodiodes comprise a standardized infrared communications scheme protocol.

11. (Amended) The method of Claim 8 wherein in step [c)] f), said infrared communications scheme protocol comprises a protocol developed by the Infrared Data Association.

12. (Amended) The method of Claim 8 wherein step [c)] f), said first and second circuit cards [modules] are housed within an enclosure.

13. (Amended) The method of Claim 8 wherein in step [c)] f),

said first and second circuit cards are operative to run an embedded application.

14. (Amended) The method of Claim 8 wherein step [c)] f), said system comprises a multiplicity of circuit cards [modules] wherein each respective one of said multiplicity of circuit cards [modules] has a dedicated transmitter LED and receiver photodiode formed thereon, each respective one of said multiplicity of circuit cards [modules] being operative to transmit and receive data via said transmitter LED and receiver photodiode formed thereon with the respective other circuit cards [modules] of said multiplicity of circuit cards. [modules].

Please add the following new Claims:

15. (New) A shock-resistant system for operatively interconnecting circuit cards within a computer system to enable data to be transmitted and received therebetween comprising:

a) a common backplane having a plurality of circuit card connectors disposed in spaced apart relation thereon for supporting circuit cards in a generally upright parallel relationship;

b) a first circuit card mounted to one of said circuit card connectors, said first circuit card having a first optical communications device formed thereon;

c) a second circuit card mounted to another of said

circuit card connectors, said second circuit card having a second optical communications device formed thereon; and

d) wherein said first and second circuit cards are maintained in fixed relationship to one another via said common backplane to effectuate optical intercard communications therebetween, said intercard communications being conducted independent of shock-susceptible wired connectors.

BBB:STB

T:\Client Documents\NORTH\390a\NORTH-390A Amendment (Marked) (v2).wpd